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# Navy Medicine and the Eradication of the Tetanus Menace

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Due to the research and practice of immunization not one American serviceman or woman would die disease in World War II.

By André B. Sobocinski, BUMED Historian

Before the advent of tetanus antitoxin, “lock-jaw” attacked many of the wounded and killed almost all of its victims. Antitoxin prophylaxis and treatment improved the situation but, in spite of the best possible use of antitoxic serum, tetanus still occurred, and those who developed the infection, the mortality remained high.

~Capt. W.W. Hall, MC, USN

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Even before the days of Hippocrates tetanus was a well-known and grisly disease recognized as producing muscle spasms, muscular rigidity (e.g., lock-jaw), seizures, broken bones and even death. Caused by the anaerobic bacterium *C. tetani* that thrives in soil, rusty metal, and manure, it is transmitted through simple cuts, scrapes and puncture wounds. The disease can take as little as days to manifest and can kill up to thirty percent of its victims.

Thanks to immunization and a booster shot taken every ten years the tetanus horror of yesteryear has been wiped from our collective memories. Nevertheless, for

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June 2015 (1)

May 2015 (20)

April 2015 (20)

March 2015 (21)



Hall was dispatched to the Naval Academy at Annapolis, Maryland to test the toxoid injections on a larger population of volunteers.

those in the armed forces there is no denying the disease once proved a real problem.

On the battlefields of France and Belgium during World War I contracting tetanus could be a death sentence. One source cites that between 80 to 90 percent of tetanus victims in the Great War died. Typically, the soldier was inoculated with an antitoxin only after suffering an injury and already infected with the disease. The antitoxin provided a very limited “passive immunity” against the disease.

In the 1920s, Louis Bazy and George Ramon of the Pasteur Institute developed a tetanus toxoid that would stimulate the body’s ability to make antitoxins for immunizing (i.e., “active immunization”). Many of early toxoid studies were continued in the United States in the 1930s; and beginning in June 1934, the U.S. Navy pioneered the largest experimental tetanus toxoid study

ever conducted on a control population.

Led by researcher Lt. Cmdr. (later Capt.) W.W. Hall, Medical Corps, and taking place aboard the hospital ship USS *Relief* (AH-1), the Navy study looked at the proper intervals between injections as well as the required number of injections for successful immunization with an alum-precipitated toxoid.

The study offered promising results and showed that the body’s resistance to the disease was greater than the “natural or artificial introduction of an antigen.” Soon after, Hall was dispatched to the Naval Academy at Annapolis, Maryland to test the toxoid injections on a larger population of volunteers.

In 1938, Hall, in conjunction with Capt. Reynolds Hayden, commanding officer of Naval Hospital Annapolis, inoculated the entire student body at the academy (2,300 midshipmen) with alum-precipitated tetanus toxoid. The researchers found that although the toxoid provided immunity it also yielded too many reactions. Researchers determined that it was necessary that future batches of tetanus toxoid be tested to ensure safety and effectiveness.



After the second dose was administered identification tags (“dog tag”) were die-stamped with a capital “T” followed by the month and last two digits of the year of immunization.

In part due to the success of USS *Relief* and Annapolis trials, in 1941, BUMED instituted a program of immunizing all Navy and Marine personnel against tetanus with the alum-precipitated toxoid

Originally, consisting of three doses of 1 cc each administered subcutaneously with an interval

February 2015 (16)
January 2015 (12)
December 2014 (17)
November 2014 (11)
October 2014 (15)
September 2014 (20)
August 2014 (14)
July 2014 (13)
June 2014 (8)
May 2014 (11)
April 2014 (9)
March 2014 (14)
February 2014 (7)
January 2014 (7)
December 2013 (7)
November 2013 (12)
October 2013 (7)
September 2013 (14)
August 2013 (13)
July 2013 (11)
June 2013 (22)
May 2013 (15)
April 2013 (14)
March 2013 (14)
February 2013 (14)
January 2013 (12)
December 2012 (11)
November 2012 (11)
October 2012 (7)
September 2012 (9)
August 2012 (12)
July 2012 (13)
June 2012 (17)
May 2012 (22)
April 2012 (14)
March 2012 (13)
February 2012 (14)

of three weeks between injections, in August the course of immunization was changed to two injections of .5 ½ cc of alum-precipitated tetanus toxoid with an interval of between four and eights weeks. A year later a “booster” injection of .5 ½ cc was given. After the second dose was administered identification tags (“dog tag”) were die-stamped with a capital “T” followed by the month and last two digits of the year of immunization.

Due to the research and practice of immunization not one American serviceman or woman would die of the disease in World War II.

January 2012 (13)
December 2011 (13)
November 2011 (20)
October 2011 (22)
September 2011 (12)
August 2011 (16)
July 2011 (10)

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